(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property **Organization**

International Bureau



(43) International Publication Date 24 December 2003 (24.12.2003)

(10) International Publication Number WO 2003/106595 A3

- (51) International Patent Classification7: C10L 1/14, 10/00
- (21) International Application Number:

PCT/US2003/018724

- 13 June 2003 (13.06.2003) (22) International Filing Date:
- (25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data: 60/388,693

14 June 2002 (14.06.2002) US

- (71) Applicant (for all designated States except US): THE LU-BRIZOL CORPORATION [US/US]; 29400 Lakeland Boulevard, Wickliffe, OH 44092-2298 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): FORESTER, David, R. [US/US]; 10209 Stonehedge Drive, Concord Township, OH 44077 (US). ROBERTS, David, C. [US/US]; 38501 Eagle Nest Lane, Willoughby Hills, OH 44094 (US). MANKA, John, S. [US/US]; 10440 Penni-man Drive, Chardon, OH 44024 (US). MALIK, Bharat, B. [IN/US]; 640 Birch Drive, Euclid, OH 44132-2106 (US).
 - (74) Agents: MUNSON, Jeffrey, F. et al.; The Lubrizol Corporation, 29400 Lakeland Boulevard, Wickliffe, OH 44092-2298 (US).

- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments
- (88) Date of publication of the international search report: 26 February 2004

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: JET FUEL ADDITTVE CONCENTRATE COMPOSITION AND FUEL COMPOSITION AND METHODS THEREOF

(57) Abstract: A jet fuel additive concentrate composition comprises a solvent and a combination of components. A fuel composition and methods to improve thermal stability of a jet fuel and to reduce deposits in a jet engine include the jet fuel additive concentrate composition. The improvement in the thermal stability of a jet fuel is synergistic when the combination of components includes a cold-flow improving composition.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system tollowed by classification symbols)

C10L IPC 7

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 99/25793 A (BP OIL INT ; TAYLOR SPENCER EDWIN (GB)) 27 May 1999 (1999-05-27) cited in the application page 8, line 1 - page 10, line 10	1,3,4, 9-14
X	WO 01/079397 A (INFINEUM INTERNAT LTD; FAVA CARLO (GB); JACKSON GRAHAM (GB)) 25 October 2001 (2001-10-25) page 12, line 20 - page 13, line 2; claims 1-4,8-13 page 20, line 1 - line 11 page 28, line 24 - page 29, line 10	1,3,4, 9-11,15, 17,21,22
X	US 5 821 202 A (MALIK BHARAT B ET AL) 13 October 1998 (1998-10-13) cited in the application column 11, line 20 - column 12, line 60; claims 13,23,27 -/	1,2,8, 10,12,13

X Further documents are listed in the continuation of box C.	χ Patent family members are listed in annex.
Special categories of cited documents: A' document defining the general state of the art which is not considered to be of particular relevance E' earlier document but published on or after the international filing date L' document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) O' document referring to an oral disclosure, use, exhibition or other means P' document published prior to the international filing date but later than the priority date claimed	 "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "&" document member of the same patent family
Date of the actual completion of the international search	Date of mailing of the international search report
12 December 2003	19/12/2003
Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	de La Morinerie, B

Form PCT/ISA/210 (second sheet) (July 1992)



•		PCT/0S 03/18724		
C.(Continu	ation) DOCUMENTS CONSIDERED TO BE RELEVANT			
Category °	Citation of document, with indication where appropriate, of the relevant passages	Relevant to claim No.		
X	WO 99/25677 A (LUBRIZOL ADIBIS HOLDINGS LTD; MORETON DAVID JOHN (GB)) 27 May 1999 (1999-05-27) cited in the application page 18; claim 14; example 1 page 24, paragraph 27	1,3,4,7, 9,10		
X	WO 87/01126 A (LUBRIZOL CORP) 26 February 1987 (1987-02-26) page 17, line 20 - line 25	1,4		
A	US 6 017 370 A (ZIEGLER KIM L ET AL) 25 January 2000 (2000-01-25) cited in the application the whole document	15,17-21		
A	WO 99/61562 A (INFINEUM UK LTD; INFINEUM USA LP (US)) 2 December 1999 (1999-12-02)	1,2, 9-11,15, 17,21,22		
	page 33, line 8 - line 16; claims 1-8,11,12,16-18 page 34, line 1 - line 12			
A	US 4 234 435 A (DAVIS KIRK E ET AL) 18 November 1980 (1980-11-18) cited in the application column 19, line 53 - line 63; example 40	4,5		
A	EP 0 678 568 A (BETZ EUROP INC) 25 October 1995 (1995-10-25) cited in the application the whole document	6		
A	EP 0 476 196 A (ETHYL PETROLEUM ADDITIVES LTD) 25 March 1992 (1992-03-25) page 4, line 8 - line 35 page 9, line 31 page 11, line 16 - line 17	1-25		
A	WO 01/062874 A (LUBRIZOL CORP) 30 August 2001 (2001-08-30) cited in the application the whole document	15,17-20		

ation on patent family members

PCT/US 03/18724

Patent document sited in search report		Publication date		Patent family member(s)	Publication date
WO 9925793	A	27-05-1999	AT	206744 T	15-10-2001
NO 3323/33	^	27 03 1333	AU	733400 B2	10-05-2001
			AU	1164199 A	07-06-1999
			BG	104518 A	30-03-2001
			BR	9814151 A	27-11-2001
			CA	2309061 A1	27-05-1999
			CN	1278856 T	03-01-2001
			DE	69802003 D1	15-11-2001
			EP	1029026 A1	23-08-2000
			GB	2346154 A ,B	02-08-2000
			WO	9925793 A1	27-05-1999
			HÜ	0004736 A2	28-04-2001
			JP	2002506085 T	26-02-2002
		•	NO	200230003 T	05-07-2000
			PL	340304 A1	29-01-2001
			SK	6772000 A3	03-12-2001
		•	TR	200001227 T2	22-01-2001
			US	6270537 B1	07-08-2001
		•		2001003231 A1	14-06-2001
·			US	9809742 A	26-04-2000
			ZA	9809/42 A	
WO 0179397	Α	25-10-2001	AU	5832901 A	30-10-2001
			CA	2403793 A1	25-10-2001
			WO	0179397 A2	25-10-2001
			EP	1274820 A2	15-01-2003
US 5821202	Α	13-10-1998	AU	6362298 A	05-11-1998
			CA	2235835 A1	29-10-1998
			DE	69815752 D1	31-07-2003
			EP	0877072 A2	11-11-1998
WO 9925677	Α	27-05-1999	AU	1047299 A	07-06-1999
WO 3323077	••	2. 00 200	DE	69811208 D1	13-03-2003
			DE	69811208 T2	27-11-2003
		•	EP	0954517 A1	10-11-1999
			WO.	9925677 A1	27-05-1999
			JP	2001508084 T	19-06-2001
		*	ÜS	6200936 B1	13-03-2001
WO 8701126	Α	26-02-1987	US	4659338 A	21-04-1987
		,	US	4690687 A	01-09-1987
			AT	77828 T	15-07-1992
			AT	118528 T	15-03-1995
			AT	154068 T	15-06-1997
			AU	591394 B2	30-11-1989
			· AU	6192986 A	10-03-1987
			AU	600058 B2	02-08-1990
			AU	8253087 A	31-03-1988
			BR	8606850 A	03-11-1987
		•	CA	1303853 C	23-06-1992
			CN	86106817 A ,B	27-05-1987
				3650239 D1	23-03-1995
			DE		
			DE	3650239 T2	08-06-1995
			DE DE	3650239 T2 3650634 D1	08-06-1995 10-07-1997
			DE DE DE	3650239 T2 3650634 D1 3650634 T2	08-06-1995 10-07-1997 15-01-1998
		•	DE DE DE DE	3650239 T2 3650634 D1 3650634 T2 3685877 D1	08-06-1995 10-07-1997 15-01-1998 06-08-1992
		•	DE DE DE	3650239 T2 3650634 D1 3650634 T2	08-06-1995 10-07-1997 15-01-1998

Patent document sited in search report		Publication date		Patent family member(s)	Publication date
WO 8701126	Α		DK	66695 A	12-06-1995
MO 0/01120	^		DK	192587 A	16-04-1987
			EP	0233250 A1	26-08-1987
		•	EP	0423744 A1	24-04-1991
			EP	0579339 A1	19-01-1994
			ES	2001515 A6	01-06-1988
			FI	871661 A	15-04-1987
		•	FI	871707 A	16-04-1987
					23-04-1993
			HK	36993 A	31-01-1991
			IL	79599 A	29-12-1990
			IN	167837 A1	27-09-1995
			JP	7088514 B	
			JP	63500602 T	03-03-1988
			MX	164983 B	13-10-1992
			NO	871551 A ,B	13-04-1987
			NO	952019 A	22-05-1995
			SG	15993 G	16-04-1993
			WO	8701126 A1	26-02-1987
			US	4804389 A	14-02-1989
			ZA	8606177 A	25-03-1987
US 6017370	Α	25-01-2000	EP	0989176 A1	29-03-2000
WO 9961562	Α	02-12-1999	AU	4143199 A	13-12-1999
MO 3301302	A	UL 12 1333	CA	2332868 A1	02-12-1999
			DE	69903545 D1	21-11-2002
			DE	69903545 T2	14-08-2003
			WO	9961562 A1	02-12-1999
			EP	1088045 A1	04-04-2001
			JP	2002516382 T	04-06-2002
			US	6232277 B1	15-05-2001
 US 4234435	Α	18-11-1980	NONE		
EP 0678568	Α	25-10-1995	US	5621154 A	15-04-1997
			AT	194379 T	15-07-2000
			AU	686321 B2	05-02-1998
			AU	1635395 A	26-10-1995
			CA	2146958 A1	20-10-1995
			DE	69517735 D1	10-08-2000
			DE	69517735 T2	01-03-2001
	•		EP	0678568 A1	25-10-1995
			ES	2147594 T3	16-09-2000
			PT	678568 T	31-10-2000
			ÜŚ	5596130 A	21-01-1997
				5725611 A	10-03-1998
			US	5725611 A 9510186 A	10-03-1998 14-10-1997
			US BR	9510186 A	14-10-1997
			US BR FI	9510186 A 972828 A	14-10-1997 01-07-1997
			US BR FI JP	9510186 A 972828 A 10512310 T	14-10-1997 01-07-1997 24-11-1998
			US BR FI JP NO	9510186 A 972828 A 10512310 T 972720 A	14-10-1997 01-07-1997 24-11-1998 02-07-1997
			US BR FI JP NO NZ	9510186 A 972828 A 10512310 T 972720 A 301909 A	14-10-1997 01-07-1997 24-11-1998 02-07-1997 25-11-1998
			US BR FI JP NO NZ PL	9510186 A 972828 A 10512310 T 972720 A 301909 A 320942 A1	14-10-1997 01-07-1997 24-11-1998 02-07-1997 25-11-1998 24-11-1997
			US BR FI JP NO NZ PL TR	9510186 A 972828 A 10512310 T 972720 A 301909 A 320942 A1 960797 A1	14-10-1997 01-07-1997 24-11-1998 02-07-1997 25-11-1998 24-11-1997 21-10-1996
			US BR FI JP NO NZ PL	9510186 A 972828 A 10512310 T 972720 A 301909 A 320942 A1	14-10-1997 01-07-1997 24-11-1998 02-07-1997 25-11-1998 24-11-1997 21-10-1996 11-07-1996
EP 0476196	A		US BR FI JP NO NZ PL TR WO	9510186 A 972828 A 10512310 T 972720 A 301909 A 320942 A1 960797 A1 9620990 A1	14-10-1997 01-07-1997 24-11-1998 02-07-1997 25-11-1998 24-11-1997 21-10-1996 11-07-1996
EP 0476196	A	25-03-1992	US BR FI JP NO NZ PL TR WO	9510186 A 972828 A 10512310 T 972720 A 301909 A 320942 A1 960797 A1 9620990 A1	14-10-1997 01-07-1997 24-11-1998 02-07-1997 25-11-1998 24-11-1997 21-10-1996 11-07-1996

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
EP 0476196	A		CA	2051452 A1	21-03-1992
			DE	69004692 D1	23-12-1993
			DE	69004692 T2	10-03-1994
			ES	2060058 T3	16-11-1994
			JP	4234489 A	24-08-1992
			US	5944858 A	31-08-1999
WO 0162874	 А	30-08-2001	US	6610110 B1	26-08-2003
020201			AU	6654901 A	03-09-2001
	•		CA	2399882 A1	30-08-2001
			ΕP	1257620 A2	20-11-2002
			JΡ	2003524060 T	12-08-2003
			WO.	0162874 A2	30-08-2001
			ÜS	2002184814 A1	12-12-2002